Discussion

The aim of this project was to develop an experimental framework for probing punishment instrumental learning over multiple days with the focus on primary punishments. For this objective we used a mobile platform that can be used outside the lab by subjects and can be monitored remotely.

**This study is using a novel design** in which 12 subjects played a trial-and-error learning game on a mobile platform for 12 days outside of the laboratory at their natural environment.

**The results show** that subjects of both groups learned stimuli values throughout the 12 days of the experiment…

habituation…

motivation…

**Moreover,** from the heartrate data that we collected when subjects played the games, we can see….

**Habituation.**

**Motivation.**

**This study has a small sample size** and therefore will not enable us to make conclusions about the differences between groups. However…

**The between-subjects design** is different from some other human studies probing punishments. This design gives a cleaner effect to the US punisher, as we avoid the confounds that a within design might obtain (Charness et al 2012). Importantly, we used a different primary punisher (Loud White Noise) than *Delgado et al 2011* (Mild shock) that showed more efficacy in the Sperl et al study (2016).

Our target was to make the task **similar to the environment of punishment** and therefore the method of choosing was by avoidance. To do that we made participants withdraw from the stimulus they did not wanted and only by that the paired stimulus was chosen. This method choosing by withdraw was also used in Huys et al (2011).

**Limitations and confounds** of the study.

**Similar future studies should** explore more conclusively the differences between a primary-positive and a secondary-negative punishers and compare them to the mechanisms of reward reinforcers.